This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Canceled)

Claim 2 (Previously presented): A method comprising:

initiating a search for images based on at least one query keyword in a query;

identifying, during the search, first images having associated keywords that match the query keyword and second images that contain low-level features similar to those of the first images; and

ranking the first and second images.

Claim 3 (Previously presented): A method as recited in claim 2, further comprising presenting the first and second images.

Claim ~~4~~ 3 (Previously presented): A method comprising:

initiating a search for images based on at least one query keyword in a query;

identifying, during the search, first images having associated keywords that match the query keyword and second images that contain low-level features similar to those of the first images;

presenting the first and second images to a user; and

monitoring feedback from the user as to which of the first and second images are relevant to the query.

Claim ~~5~~ 4 (Previously presented): A method comprising:

initiating a search for images based on at least one query keyword in a query;

identifying, during the search, first images having associated keywords that match the query keyword and second images that contain low-level features similar to those of the first images;

presenting the first and second images to a user;

receiving feedback from the user as to whether the first and second images are relevant to the query; and

learning how the first and second images are identified based on the feedback from the user.

C1

5. Claim ~~6~~ (Previously presented): A method as recited in claim ~~2~~ 1, wherein the monitoring comprises

presenting the first and second images to a user;

receiving feedback from the user as to whether the first and second images are relevant to the query further comprising:

refining the search to identify additional images that contain low-level features similar to those of the images indicated by the user as being relevant to the query.

6. Claim ~~7~~ (Previously presented): A method as recited in claim ~~2~~ 1, wherein the monitoring comprises

presenting the first and second images to a user;

receiving feedback from the user as to whether the first and second images are relevant to the query further comprising:

assigning a large weight to an association between the query keyword and the images deemed relevant by the user.

7. Claim ~~8~~ (Original): A method as recited in claim ~~7~~ 6, further comprising grouping the low-level features of the images deemed relevant by the user.

C

8.

Claim ~~9~~ (Previously presented): A method as recited in claim ~~2~~ 1, wherein the monitoring comprises

presenting the first and second images to a user;

receiving feedback from the user as to whether the first and second images are relevant to the query further comprising:

assigning a small weight to an association between the query keyword and the example image.

9. 8

Claim ~~10~~ (Original): A method as recited in claim ~~9~~, further comprising identifying additional images with low-level features similar to those of the example image.

10.

Claim ~~11~~ (Previously presented): A computer readable medium having computer-executable instructions that, when executed on a processor, perform the method as recited in claim ~~2~~.

11.

Claim ~~12~~ (Original): A method comprising:

permitting entry of both keyword-based queries and content-based queries;

finding images using both semantic-based image retrieval and low-level feature-based image retrieval;

presenting the images to a user so that the user can indicate whether the images are relevant; and

conducting semantic-based relevance feedback and low-level feature-based relevance feedback in an integrated fashion.

Claim ~~13~~ 12 (Original): A method as recited in claim ~~12~~ 11, further comprising ranking the images.

Claim ~~14~~ 13 (Original): A method as recited in claim ~~12~~ 11, further comprising using images indicated as being relevant to find additional images.

Claim ~~15~~ 14 (Original): A computer readable medium having computer-executable instructions that, when executed on a processor, perform the method as recited in claim ~~12~~ 11.

Claims 16-19 (Canceled)

Claim ~~20~~ 15 (Original): A method comprising:

presenting a result set of images that are returned from an image retrieval search of a query having at least one keyword;

monitoring feedback from a user as to whether the images in the result set are relevant to the query;

in an event that the user selects at least one image as being relevant to the query, associating the keyword in the query with the selected image to form a first keyword-image association and assigning a comparatively large weight to the first keyword-image association; and

in an event that the user identifies an example image for refinement of the search, associating the keyword in the query with the example image to form a second keyword-image association and assigning a comparatively small weight to the second keyword-image association.

Claim ~~21~~ 16 (Original): A method as recited in claim ~~20~~ 15, further comprising conducting both content-based image retrieval and semantic-based image retrieval.

Claim ~~22~~ 17 (Original): A method as recited in claim ~~20~~ 15, further comprising presenting the result set of images in a user interface, the user interface facilitating the user feedback by allowing the user to indicate which images are more relevant and which images are less relevant.

Claim ~~23~~ 18 (Original): A computer readable medium having computer-executable instructions that, when executed on a processor, perform the method as recited in claim ~~20~~ 15.

Claim 24 (Previously presented): A method comprising:

computing, for each category, a representative feature vectors of a set of existing images within the category;

determining a set of representative keywords that are associated with the existing images in each category;

comparing, for each new image, the low-level feature vectors of the new image to the representative feature vectors of the existing images in each category to identify a closest matching category; and

labeling the new image with the set of representative keywords associated with the closest matching category.

Claim 25 (Previously presented): A method as recited in claim 24, further comprising using user feedback to selectively add and/or remove keywords from the new image.

Claim 26 (Original): A method as recited in claim 24, further comprising:

placing the labeled new images into a holding category;

evaluating the labeled new images in the holding category to determine if any of the keywords associated with the labeled new image match the representative keywords from each category; and

assigning the labeled new image to the category that best matches the keywords associated with the labeled new image.

Claim 27 (Canceled)

Claim 28 (Previously presented): An image retrieval system comprising:

a query handler to handle both keyword-based queries having one or more search keywords and content-based queries having one or more low-level features of an image; and

a feature and semantic matcher to identify at least one of (1) first images having keywords that match the search keywords from a keyword-based query, and (2) second images having low-level features similar to the low-level features of a content-based query, wherein the feature and semantic matcher ranks the images.

Claim 29 (Previously presented): An image retrieval system as recited in claim 28, wherein the query handler comprises a natural language parser.

C1

21

Claim ~~20~~ (Previously presented): An image retrieval system as recited in claim ~~28~~, wherein the query handler comprises:

a parser to parse text-based queries; and

a concept hierarchy to define various categories of images.

22

Claim ~~21~~ (Previously presented): An image retrieval system as recited in claim ~~28~~, further comprising a user interface to present the images identified by the feature and semantic matcher.

Sub Del

Claim 32 (Previously presented): An image retrieval system comprising:

a query handler to handle both keyword-based queries having one or more search keywords and content-based queries having one or more low-level features of an image;

a feature and semantic matcher to identify at least one of (1) first images having keywords that match the search keywords from a keyword-based query, and (2) second images having low-level features similar to the low-level features of a content-based query;

a user interface to present the images identified by the feature and semantic matcher to a user, the user interface allowing the user to indicate whether the images are relevant to the query; and

a feedback analyzer to train the image retrieval system based on user feedback as to relevancy.

C

Claim ~~33~~ 24 (Previously presented): An image retrieval system as recited in claim ~~28~~ 19, further comprising:

a user interface to present the images identified by the feature and semantic matcher to a user, the user interface allowing the user to identify an example image; and

the feature and semantic matcher being configured to identify additional images that contain low-level features similar to those of the example image.

Claim ~~34~~ 25 (Previously presented): An image retrieval system as recited in claim ~~28~~ 19, further comprising:

a user interface to present the images identified by the feature and semantic matcher to a user, the user interface allowing the user to identify which images are relevant to a particular search query; and

a feedback analyzer to assign a large weight to an association between the search keywords and the images identified as relevant by the user.

Claim ~~35~~ 26 (Original): An image retrieval system as recited in claim ~~34~~ 25, wherein the feedback analyzer groups the low-level features of the images identified as relevant by the user.

40

Claim 36 (Previously presented): An image retrieval system as recited in claim 28, further comprising:

a user interface to present the images identified by the feature and semantic matcher to a user, the user interface allowing the user to identify an example image as being less relevant or irrelevant to the query; and

a feedback analyzer to assign a small weight to an association between the search keywords and the example image.

Claim 37 (Original): An image retrieval system as recited in claim 36, wherein the feature and semantic matcher identifies additional images with low-level features similar to those of the example image.

Claim 38 (Canceled)

Claim 39 (Previously presented): A computer-readable medium having computer-executable instructions that, when executed, directs a computer to:

find images using both semantic-based image retrieval and low-level feature-based image retrieval;

present the images to a user so that the user can indicate whether the images are relevant; and

concurrently conduct semantic-based relevance feedback and low-level feature-based relevance feedback.

C1

Claim ~~40~~ 29 (original): A program as recited in claim ~~39~~ 28, further comprising computer-executable instructions that, when executed, direct a computer to rank the images.

Claim ~~41~~ 30 (Original): An information retrieval program, embodied on the computer-readable medium, comprising the computer-executable instructions of claim ~~39~~ 28.

Claim ~~42~~ 31 (Previously presented): A computer readable medium having computer-executable instructions that, when executed on a processor, perform the method as recited in claim ~~4~~ 3.

42

C